

## **Course Name: Statistics and Probability**

Semester or Year-Long  
Grade Level: 11, 12

Endorsement Requirement: Level 4  
Prerequisite: Geometry

### **Course Description:**

*Statistics and Probability is an introductory project- and activity-based course where students critically analyze information about their world. Students will pursue questions based on their own experiences and gather data from media, their own experiments, and common objects. Students will practice critical thinking skills as they gather and interpret information about their world. Students will learn how to collect data, organize their own and others' data, and display the data in graphs and charts that will be useful in answering their questions and forming conclusions. Students will estimate probabilities in experiments, and compare experimental and theoretical probabilities. All topics should be included in either a semester or a year-long course, differentiated by the depth of the material covered.*

### **Course Outline:**

“Every high school graduate should be able to use sound statistical reasoning to intelligently cope with the requirements of citizenship, employment, and family and to be prepared for a healthy, happy, and productive life” (GAISE Report, American Statistical Association, 2007).

Students will:

#### Formulate Questions

- Formulate questions to determine how data can be collected and analyzed to answer their questions.

#### Collect Data

- Understand the importance of randomization in sampling and experimental design.
- Distinguish between populations and samples.
- Use simulation and probability to model possible outcomes of events.
- Use good practice to design and conduct:
  - Sample surveys.
  - Experiments.
  - Observational studies.

#### Analyze Data

- Identify statistically appropriate ways to display and summarize data using measures of central tendency and variation.
- Understand percentile.
- Graph probability distributions, including the normal distribution.

- Interpret data based on the normal distribution.
- Choose appropriate techniques to explore univariate and bivariate data.
- Explore the possible relationships between explanatory and response variables.

#### Interpret Results

- Understand that conclusions based on unbiased samples can provide valuable information about a population.
- Recognize reasonably likely outcomes vs. outcomes that are unlikely, and then form an appropriate conclusion.
- Interpret the margin of error associated with an estimate of a population characteristic.

The course will require the use of handheld technology and/or statistical software.

#### **Teacher Resources:**

*GAISE Report*, American Statistical Association, 2007.

Lovell, Robert. *Probability Activities*. Key Curriculum Press, 1992. (ISBN: 978-1559530675).

The Quantitative Literacy Series: *Exploring Data*, *Exploring Probability*, *The Art and Techniques of Simulation*, and *Exploring Surveys and Information from Samples*, Dale Seymour Publications, 1994. (ISBN: 978-0866516105).

Brase and Brase. *Understanding Basic Statistics*. Houghton Mifflin Company, 2006. (ISBN: 978-0618632275).

Yates, Dan, David Moore, and Daren Starnes. *The Practice of Statistics*. W. H. Freeman, 2007. (ISBN: 978-0716773092).

Moore, David and William Notz. *Statistics: Concepts and Controversies*. W. H. Freeman, 2005. (ISBN: 978-0716736368).

Scheaffer, Richard. *Activity-Based Statistics*. Key College, 2004. (ISBN: 978-1930190733).

Rossman, Allan and Beth Chance. *Workshop Statistics*. Key College, 2000. (ISBN: 978-1930190030).

Optional Software: Fathom, ActivStats, Mini-Tab, JMP.